IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Katrina Schmidt, et al.	:	
Serial No.	:	10/644,450	**: Group:**	1796
Atty. No	:	12166	**: Examiner:**	Cooney, John M.
Filed	:	August 20, 2003	:	
Title	:	FORMULATED RESIN COMPONENT FOR USE IN A SPRAY-IN -PLACE FOAM SYSTEM TO PRODUCE LOW DENSITY POLYURETHANE FOAM		

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Commissioner of Patents
P.O. Box 1450
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AMENDED BRIEF ON APPEAL

Dear Sir:

Subsequent to the filing of the Notice of Appeal on February 29, 2008, Applicant re-submits a brief in support of the appeal in response to the Final Rejection set forth in the Office Action dated November 30, 2007 and the Notice of Non-Compliant Appeal Brief dated May 5, 2008. In response to the Notice of Non-Compliant Appeal Brief, Applicant has amended the status of claims as requested. In a telephonic interview with Examiner Cole, it was determined that the ground of rejection under 37 C.F.R. 41.37(c)(1)(vii) is improper and should be withdrawn. Only a single copy of this Appeal Brief is being submitted in accordance with 37 C.F.R. §41.37 and this Appeal Brief is accompanied by the required fee under §41.20(b)(2).

Real Party in Interest

The inventor assigned this application to BASF Corporation as evidenced by an assignment recorded at reel 014789, frame 0378.

Related Appeals and Interferences

None.

Status of Claims

Claims 26, 28, 29, 31, 34, 36-39, 41, 42, and 44 remain in this application with claims 26 and 39 in independent form and are attached hereto in the appendix. Claims 1-25, 27, 30, 32-33, 35, 40, 43, and 45-46 have been cancelled.

Claims 26, 28, 29, 31, 34, 36-39, 41, 42, and 44 stand finally rejected under 35 U.S.C. §103(a) and are the subject of this appeal.

Status of Amendments

All amendments have been entered and are reflected in the claims in the Appendix.

Summary of Claimed Subject Matter

Claim 26 claims a polyurethane foam for insulating structures that is produced from a polyurethane spraying system as described in paragraph [0014], page 5, lines 10+, paragraph [0015], page 6, lines 6-11, and Figures 1-2. The polyurethane foam is the

reaction product of a) a resin component and b) an isocyanate component. The resin component (a) comprises a blowing agent, a first polyol, a second polyol, and a curing component. The blowing agent is present in an amount of from 15 to 40 parts by weight based on 100 parts by weight of the resin component and is described in detail in paragraph [0016], page 6, lines 21-23-page 7, lines 1-3; and Table 1. The first polyol is used in an amount of from 5 to 25 parts by weight based on 100 parts by weight of the resin component as set forth in paragraph [0017], page 7, lines 12-15; and Table 1. The first polyol has a number-average molecular weight of from 150 to 500 and has a hydroxyl number of from 250 to 1000 and has at least tetra-functionality as set forth in paragraph [0017], page 7, lines 4-12 and paragraph [0033], page 13, lines 11-12. The second polyol has a number-average molecular weight of from 3500 to 8000 and has a hydroxyl number of from 20 to 100 and has terminal hydroxyl groups, as described at paragraph [0018], page 7, lines 16-23 and paragraph [0033], page 13, lines 12-14. The curing component is used in an amount of from 2 to 15 parts by weight based on 100 parts by weight of the resin component; see paragraph [0019], page 8, lines 9-12 and paragraph [0033], page 13, lines 9-10. The curing component comprises a polyether amine having at least one primary amine group as set forth in paragraph [0019], page 8, lines 5-8. The curing component has an equivalent hydroxyl number of from 20 to 800 and has a number-average molecular weight of from 150 to 5000; see paragraph [0019], page 8, lines 8-9.

The isocyanate component comprises diphenylmethane diisocyanate as described at paragraph [0026], page 11, lines 1-12 and paragraph [0033], page 14, lines 4-5. Claim 26 also claims a) and b) are reacted in a volumetric ratio having an isocyanate

index of from 25 to 60 as set forth in paragraph [0027], page 11, lines 13-16 and paragraph [0034], page 14, lines 6-7. Claim 26 further claims the polyurethane foam is open-celled and has a density of less than 1 pound per cubic foot and low water absorption as a result of reacting the a) and b) in the volumetric ratio at the isocyanate index, see paragraph [0027], page 11, lines 21-23, page 12, lines 1-6 and paragraph [0038], page 15, lines 8-14.

Claim 39 claims a method of forming a polyurethane foam for insulating structures dispensed from a polyurethane spraying system as described in paragraph [0014], page 5, lines 10+, paragraph [0015], page 6, lines 6-11, and Figures 1-2. The method comprising the steps of providing a) a resin component and providing b) an isocyanate component comprising diphenylmethane diisocyanate as described at paragraph [0026], page 11, lines 1-12 and paragraph [0033], page 14, lines 4-5..

The resin component includes a blowing agent, a first polyol, a second polyol, and a curing component. The blowing agent is present in an amount of from 15 to 40 parts by weight based on 100 parts by weight of the resin component, see [0016], page 6, lines 21-23-page 7, lines 1-3; and Table 1. The first polyol is present in an amount of from 5 to 25 parts by weight based on 100 parts by weight of the resin component and has a number-average molecular weight of from 150 to 500, has a hydroxyl number of from 250 to 1000, and has at least tetra-functionality as set forth in paragraph [0017], page 7, lines 4-12-15; and Table 1 and paragraph [0033], page 13, lines 11-12. The second polyol has a number-average molecular weight of from 3500 to 8000, has a hydroxyl number of from 20 to 100, and has terminal hydroxyl groups, as described at paragraph [0018], page 7,

lines 16-23 and paragraph [0033], page 13, lines 12-14. The curing component is present in an amount of from 2 to 15 parts by weight based on 100 parts by weight of the resin component and comprises a polyether amine having at least one primary amine group, see paragraph [0019], page 8, lines 5-12 and paragraph [0033], page 13, lines 9-10. The curing component has an equivalent hydroxyl number of from 20 to 800 and has a number-average molecular weight of from 150 to 5000; see paragraph [0019], page 8, lines 8-9.

The method reacts a) and b) in a volumetric ratio of from 1:1.2 to 1:3 such that a) and b) are reacted having an isocyanate index of from 25 to 60 such that the polyurethane foam is open-celled and has a density of less than 1 pound per cubic foot and low water absorption as a result of reacting a) and b) in the volumetric ratio at the isocyanate index, see paragraph [0027], page 11, lines 13-23, page 12, lines 1-6, paragraph [0028], page 12, lines 7-20 and paragraph [0034], page 14, lines 6-7.

Grounds of Rejection to be Reviewed on Appeal

Whether claims 26, 28, 29, 31, 34, 36-39, 41, 42, and 44 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over Spitzer et al. (United States Patent No. 5,340,900).

Argument

Referring to MPEP 2141, and as the Examiner is aware, the question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject

matter and the prior art, (3) the level of skill in the art, and (4) secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). *See also KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. at 1734, 82 USPQ2d at 1391. Fundamentally, to establish a *prima facie* case of obviousness of a claim, the references, after combination, must teach or suggest all the claim limitations. See MPEP 2143.

As set forth in MPEP 706.02(j), the examiner should set forth in the Office action:

(A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,

(B) the difference or differences in the claim over the applied reference(s),

(C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and

(D) an explanation as to why the claimed invention would have been obvious to one of ordinary skill in the art at the time the invention was made.

Further, MPEP 706.02(j) states "It is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply." Moreover, the Examiner must consider evidence submitted both in the specification as originally filed or presented in a reply to a rejection. Specifically, referring to MPEP 2142, it states:

> When an applicant submits evidence, whether in the specification as originally filed or in reply to a rejection, the examiner must reconsider the patentability of the claimed invention. The decision on patentability must be made based upon consideration of all the evidence, including the evidence submitted by the examiner and the evidence submitted by the applicant. A decision to make or maintain a rejection in the face of all the evidence must show that it was based on the totality of the evidence. Facts established by rebuttal evidence must be evaluated along with the facts on which the conclusion of obviousness was

reached, not against the conclusion itself. *In re Eli Lilly & Co.*, 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990).

Applicant submits that the Examiner has not established the requisite *prima facie* case of obviousness in relation to claims 26, 28, 29, 31, 34, 36-39, 41, 42, and 44 because, the reference, after modification, does not teach or suggest all the claim limitations. Further, the *prima facie* case of obviousness of claims 26, 28, 29, 31, 34, 36-39, 41, 42, and 44 fails because the Examiner has not adequately articulated the proposed modification of the applied reference necessary to arrive at the claimed subject matter and has not provided an adequate explanation as to why the claimed invention would have been obvious to one of ordinary skill in the art at the time the invention was made.

The Examiner contends that Spitzer et al. discloses preparations of polyurethane products meeting the claims of the subject application. Referring to the isocyanate index limitation, the Examiner further contends that Spitzer et al. discloses employment of customary ratios in the operation of the invention for achieving the reactive effect at column 7, lines 55-63. Thus, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to operate at ***other*** customary index values beyond the exemplified ranges for controlling well-known properties.

Failure to teach or suggest all the claim limitations

Claims 26 and 39 claim that the polyurethane foam is useful as an insulating material in structures. Moreover, such polyurethane foam is dispensed from spraying systems, which are commonly referred to as "spray-in-place". Referring to paragraph [0014] of the specification as originally filed, spray-in-place foam spraying systems spray

two components as a liquid into a desired space and the components begin to rise, cream, and gel forming the polyurethane foam. It is during this process that the subject invention has reduced dripping of the components, which is believed to be from the claimed isocyanate index and volumetric ratio.

With reference to paragraphs [0027] and [0028] of the specification as originally filed, when the resin component and the isocyanate component are reacted as set forth above, the primary amine groups are present in an amount such that unreacted hydroxyl groups remain in the foam. These unreacted hydroxyl groups surprisingly reduce and/or eliminate dripping when the polyurethane foam is burned. The polyurethane foam thus meets various flammability safety standards that were previously unlikely. The reduced dripping has not been previously been possible with polyurethane foams that have a lower density, especially when sprayed at volumetric ratios of 1:1, and as such the prior art low-density foams do not meet the various flammability safety standards.

Thus, it is reacting the resin component and the isocyanate component at the claimed isocyanate index that provides that the polyurethane foam is open-celled and has a density of less than 1 pound per cubic foot and low water absorption. As set forth in paragraph [0015] of the specification as originally filed and as illustrated in the Examples, water absorption, is the ability of the polyurethane foam to absorb water from any source, such as condensation. Even though the polyurethane foam formed according to the subject invention is open celled, the polyurethane foam exhibits a low amount of water absorption, which is desirable for insulation materials. This low water absorption is highly unexpected, since the polyurethane foam is open-celled and typically, open-celled foams absorb large amounts of water.

Referring now to Spitzer et al., Spitzer et al. is directed toward a hardener for the production of polyurethane shaped articles. Spitzer et al. does not disclose any spraying system or spray-in-place foam spraying system. Furthermore, Spitzer et al. does not disclose a foam having a density of less than 1 pound per cubic foot that is open-celled with low water absorption. Spitzer et al. further discloses utilizing an isocyanate number, or index, in a customary amount. Spitzer et al. specifically states:

> The reaction mixtures according to the invention comprise the polyisocyanate in the customary amount, in general corresponding to an isocyanate number (quotient of the number of isocyanate groups and the number of groups which can react with isocyanate groups in the reaction mixture, multiplied by 100) of between ***70 and 130, preferably corresponding to an isocyanate number of between 90 and 110***. A primary amino group here again corresponds to a hydroxyl group. (See col. 7, lines 55-63). [emphasis added]

Even though the Examiner interprets the above paragraph as suggesting other ***customary*** amounts, Applicants respectfully submit that it is only the ***customary*** amounts disclosed and suggested which is between 70 and 130. Spitzer et al. goes further, i.e., ***teaches away***, from a lower range by disclosing the preferred range is 90 to 110. Additionally, none of the examples of Spitzer et al. are beyond the customary amount disclosed.

The Examiner contends it would have been obvious to operate at other customary isocyanate index values. However, there is a distinction between operating outside of 70 to 130 and presenting an entirely distinct isocyanate index range of from 25 to 60. Spitzer et al. does not disclose, teach, or suggest an entirely distinct and lower isocyanate index range. Instead, it teaches only narrowing the range within 70 to 130. Therefore, there is no teaching, suggestion, or motivation to have a range of isocyanate index of from 25 to 60 as

claimed. It is submitted that Spitzer et al. even teaches away from such a range as set forth above.

The Examiner's reliance on *Titanium Metals* is misplaced and the rejection should be withdrawn. As set forth in MPEP §2144.05,

> Similarly, a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the ***same*** properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Court held as proper a rejection of a claim directed to an alloy of "having 0.8% nickel, 0.3% molybdenum, up to 0.1% iron, balance titanium" as obvious over a reference disclosing alloys of 0.75% nickel, 0.25% molybdenum, balance titanium and 0.94% nickel, 0.31% molybdenum, balance titanium.) [emphasis added].

Thus, *Titanium Metals* holds that the ***same*** properties are to have been expected. The properties disclosed in Spitzer et al. are not the same properties disclosed in the subject application. Spitzer et al. is directed toward machinability of a shaped polyurethane article, whereas the subject invention is directed toward a polyurethane foam having a density of less than 1 pound per cubic foot that is open-celled with low water absorption and that is formed from a polyurethane spraying system. Thus, the rejection based on *Titanium Metals* should be withdrawn.

Both of the independent claims also recite that the polyurethane foam is an insulating material for a structure and that is produced from the spraying system as described above. There is no suggestion, teaching, or motivation to modify Spitzer et al. to be used with a spraying system. In fact, Spitzer et al., col. 9, lines 28-49, discloses that the two components are mixed together and deposited in a mold to give a curable reaction mixture that is shaped and cured fully to give the shaped article. The shaped article can then be removed and shaped with the aid of drills, milling machines, or saws *(see col. 3, lines 10-*

12). Spitzer et al. is silent to the open cell nature, the density, and the water absorption of the shaped article. In other words, Spitzer et al. does not disclose a foam having a density of less than 1 pound per cubic foot that is open-celled with low water absorption.

Viewing Spitzer et al. as whole would disclose to one of ordinary skill in the art that Spitzer et al. merely provides polyurethane shaped articles removable from molds to have improved machining capabilities. One of ordinary skill in the art would not look to Spitzer et al. for a polyurethane foam spraying system producing a polyurethane foam as an insulating material since Spitzer et al. is directed toward the machining of shaped articles formed in mold. Additionally, one would not look to Spitzer et al. since Spitzer et al. is silent as to the density, cell structure, and water absorption of the polyurethane shaped article. Thus, one of ordinary skill in the art, upon reviewing Spitzer et al. as a whole, would not be motivated to apply Spitzer et al. in the manner suggested by the Examiner.

In fact, there are numerous indicia that teach away from the modification suggested. Even if the modification were appropriate, each and every feature of the claimed invention is not disclosed, taught, or suggested. Therefore, the §103 rejection is overcome and claims 26 and 39 are believed to be allowable. Claims 28-29, 31, 34, 36-38, 41-42, and 44, which depend directly or indirectly from these independent claims, are also believed to be allowable.

Failure to Adequately Articulate Basis

It is respectfully submitted that the Examiner has not articulated a basis at to why the Examiner interprets the Spitzer et al. as suggesting other ***customary*** amounts other than an isocyanate index between 70 and 130. The Examiner has not articulated a reason

as to why he believes that Spitzer et al. does not teach away from a lower range by disclosing the preferred range is 90 to 110 and does not reconcile why none of the examples of Spitzer et al. are beyond the customary amount disclosed.

Even though the Examiner contends it would have been obvious to operate at other customary isocyanate index values, there is a distinction between operating outside of 70 to 130 and presenting an entirely distinct isocyanate index range of from 25 to 60. Spitzer et al. does not disclose, teach, or suggest an entirely distinct and lower isocyanate index range. Instead, it teaches only narrowing the range within 70 to 130. Therefore, there is no teaching, suggestion, or motivation to have a range of isocyanate index of from 25 to 60 as claimed. Without having an articulated basis, Applicant has been denied the opportunity to respond other than presenting the above arguments.

Additionally, the Examiner must consider evidence submitted both in the specification as originally filed or presented in a reply to a rejection. The Examiner stated in the Final Office Action dated November 30, 2007 at page 5 that Applicant has not provided any distinction of the ranges of isocyanate index in view of Spitzer et al. As stated above, the Examiner must consider the specification as a whole and specifically paragraph [0027] of the specification as originally filed wherein Applicant identifies the distinction of the claimed invention providing unexpected results of an open-celled foam that has low water absorption and improved burning characteristics as a result of the claimed ranges of isocyanate index. The Examiner has not articulated a basis for not considering and disregarding the Applicant's evidence provided in the specification as originally filed.

The Examiner also stated on page 6 of the Final Office Action that the Examiner

is not considering the term "low". However, the Examiner must consider evidence submitted both in the specification as originally filed or presented in a reply to a rejection. With reference to paragraph [0015], page 6, lines 6-19, the low water adsorption is highly unexpected since the polyurethane foam is open-celled and typically, open-celled foams absorb large amounts of water. Referring to claims 28 and 29, the subject invention claims the polyurethane foam of the subject invention having a water absorption of less than 10 percent, and 5 percent, respectively, by volume of said polyurethane foam. Therefore, the Examiner must consider the evidence in the specification and must consider each and every limitation of the claim, including the term "low" in relation to water absorption. The Examiner has failed to articulate a reason as to why the low water absorption as discussed in the specification as originally filed is not persuasive.

CLOSING

For the reasons set forth above, the rejections of claims 26, 28, 29, 31, 34, 36-39, 41, 42, and 44 under 35 U.S.C. §103(a) must be reversed.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS, P.C.

May 19, 2008
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CLAIMS APPENDIX

Claims 1-25 **(Cancelled)**

26. **(Previously Presented)**. A polyurethane foam for insulating structures that is produced from a polyurethane spraying system, said polyurethane foam being the reaction product of:

a) a resin component comprising;

a blowing agent present in an amount of from 15 to 40 parts by weight based on 100 parts by weight of said resin component,

a first polyol used in an amount of from 5 to 25 parts by weight based on 100 parts by weight of said resin component and having a number-average molecular weight of from 150 to 500 and having a hydroxyl number of from 250 to 1000 and having at least tetra-functionality,

a second polyol having a number-average molecular weight of from 3500 to 8000 and having a hydroxyl number of from 20 to 100 and having terminal hydroxyl groups, and

a curing component used in an amount of from 2 to 15 parts by weight based on 100 parts by weight of said resin component and comprising a polyether amine having at least one primary amine group, an equivalent hydroxyl number of from 20 to 800, and having a number-average molecular weight of from 150 to 5000, and

b) an isocyanate component comprising diphenylmethane diisocyanate;

wherein said a) and b) are reacted in a volumetric ratio having an isocyanate index of from 25 to 60; and

wherein said polyurethane foam is open-celled and has a density of less than 1 pound per cubic foot and low water absorption as a result of reacting said a) and b) in said volumetric ratio at said isocyanate index.

27. **(Cancelled).**

28. **(Original).** A polyurethane foam as set forth in claim 26 wherein said polyurethane foam has a water absorption of less than 10 percent by volume of said polyurethane foam.

29. **(Original).** A polyurethane foam as set forth in claim 26 wherein said polyurethane foam has a water absorption of less than 5 percent by volume of said polyurethane foam.

30. **(Cancelled).**

31. **(Original).** A polyurethane foam as set forth in claim 26 wherein said curing component has a number average molecular weight of from 250 to 2500.

32. **(Cancelled).**

33. **(Cancelled).**

34. **(Original).** A polyurethane foam as set forth in claim 26 wherein said first polyol is further defined as an aliphatic, amine-initiated polyol.

35. **(Cancelled).**

36. **(Original).** A polyurethane foam as set forth in claim 26 wherein said second polyol is used in an amount of from 5 to 25 parts by weight based on 100 parts by weight of said resin component.

37. **(Original).** A polyurethane foam as set forth in claim 26 wherein said second polyol is further defined as a triol.

38. **(Original).** A polyurethane foam as set forth in claim 26 wherein said second polyol is further defined as a diol.

39. **(Previously Presented).** A method of forming a polyurethane foam for insulating structures dispensed from a polyurethane spraying system, said method comprising the steps of:

providing a) a resin component including a blowing agent present in an amount of from 15 to 40 parts by weight based on 100 parts by weight of said resin component, a first polyol present in an amount of from 5 to 25 parts by weight based on 100 parts by weight of said resin component and having a number-average molecular weight of from 150 to 500, having a hydroxyl number of from 250 to 1000, and having at least tetra-functionality, a second polyol having a number-average molecular weight of from 3500 to 8000, having a hydroxyl number of from 20 to 100, and having terminal hydroxyl groups, and a curing component present in an amount of from 2 to 15 parts by weight based on 100 parts by weight of said resin component and comprising a polyether amine having at least one primary amine group, an equivalent hydroxyl number of from 20 to 800, and having a number-average molecular weight of from 150 to 5000,

providing b) an isocyanate component comprising diphenylmethane diisocyanate; and

reacting a) and b) in a volumetric ratio of from 1:1.2 to 1:3 such that a) and b) are reacted having an isocyanate index of from 25 to 60 such that the polyurethane foam is open-celled and has a density of less than 1 pound per cubic foot and low water absorption as a result of reacting a) and b) in the volumetric ratio at the isocyanate index.

40. **(Cancelled).**

41. **(Original).** A method as set forth in claim 39 wherein the step of reacting a) and b) is further defined as spraying a) and b).

42. **(Original).** A method as set forth in claim 41 wherein the step of spraying a) and b) is further defined as mixing a) and b) through a nozzle of a spray gun.

43. **(Cancelled)**.

44. **(Original).** A method as set forth in claim 39 wherein the curing component has a number average molecular weight of from 250 to 2500.

45. **(Cancelled)**.

46. **(Cancelled)**.

EVIDENCE APPENDIX

NONE

RELATED PROCEEDINGS APPENDIX

NONE